

**Refrigeration indicator device**

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**Abstract of GB2235969**

A device for providing an indication of thawing of a freezer compartment comprises a transparent or translucent capsule 10 partially containing a liquid 11 and, if desired, a solid body 12. The capsule 10 is placed within the compartment to allow the liquid 11 to freeze and is then inverted. A suction cup 14 or hook formation can be provided to facilitate mounting of the capsule in the required position. The device may also be in the form of a tube or sachet containing coloured ice and a layer or layers of padding which is or are coloured on melting of the ice. In this case if the ice were to melt, then regardless of the disposition of the tube, at least one of the layers of padding will become coloured. The tube may be apertured, with the padding positioned on the outside of the tube.

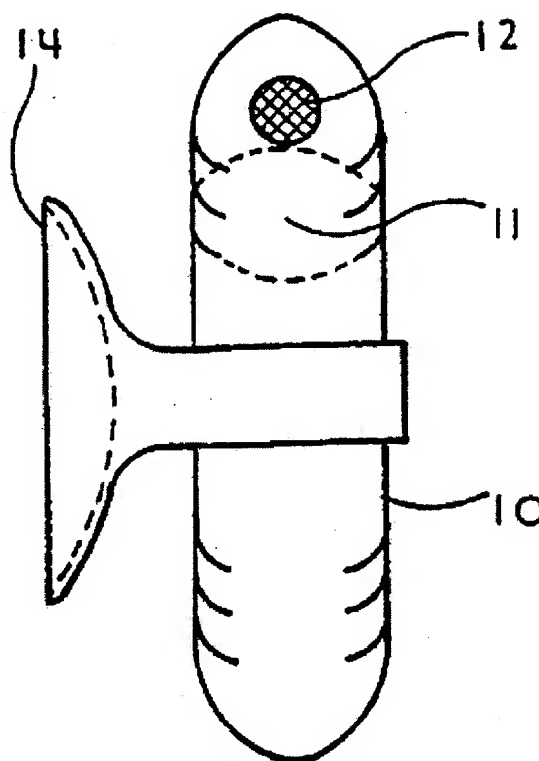


Fig 3

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(54) **Refrigeration indicator device**

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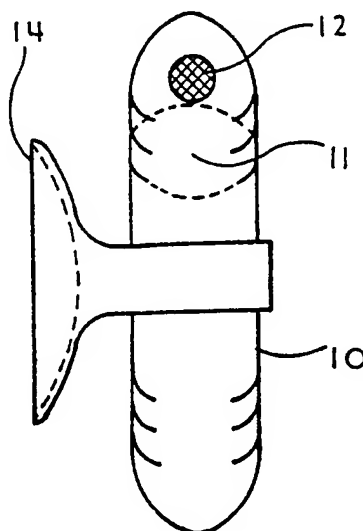
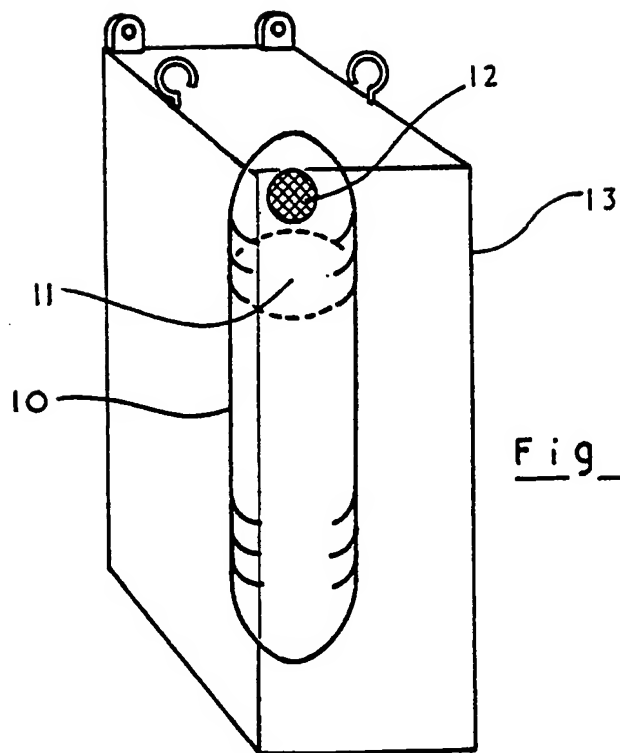
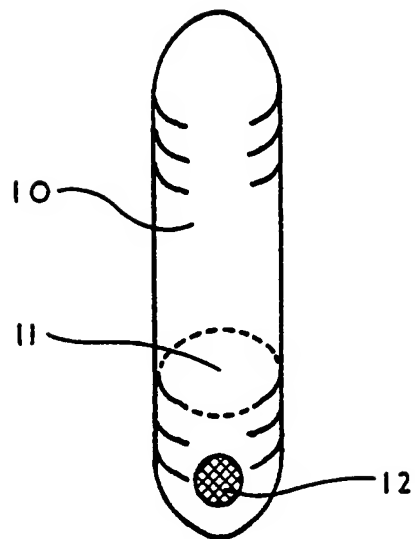


Fig 3



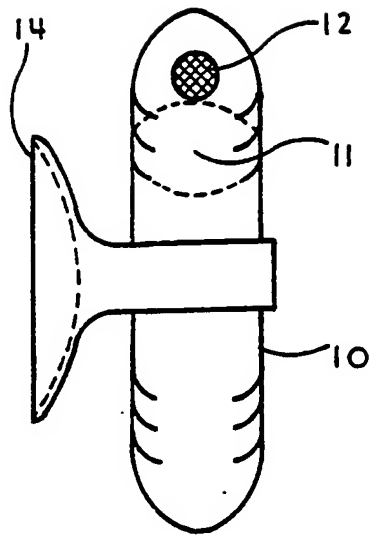


Fig 3

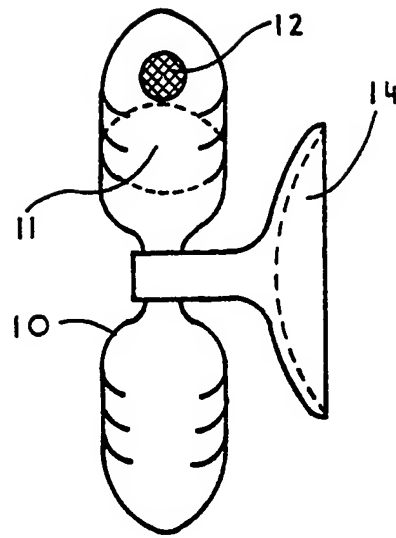


Fig 4

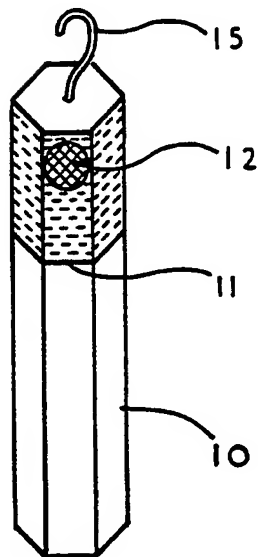


Fig 5

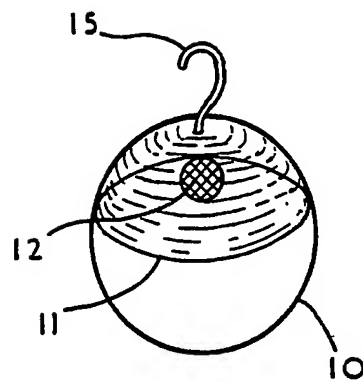


Fig 6

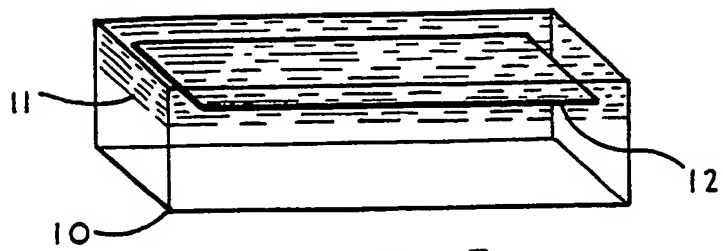


Fig 7

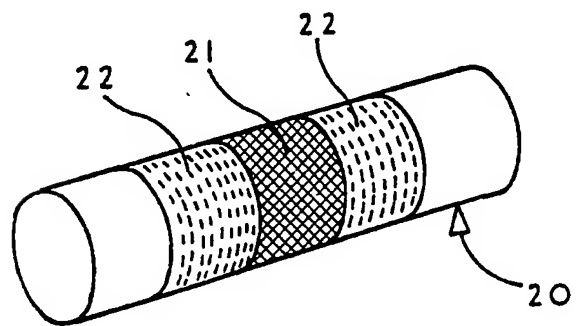


Fig 8

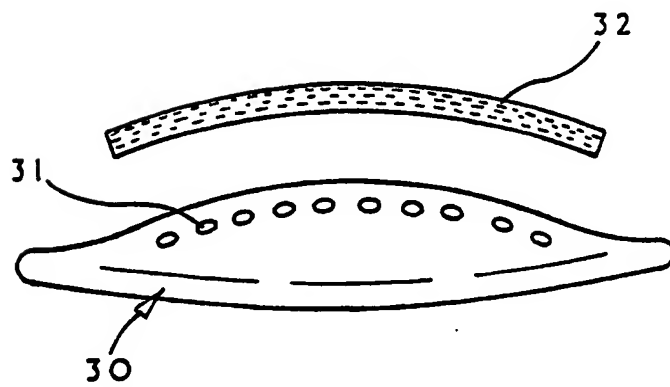


Fig 9

## REFRIGERATION INDICATOR DEVICE

### Field of the Invention

This invention relates to a refrigerator indicator device, i.e. a device for providing an indication of the non-functioning of a refrigerator. The term refrigerator as used herein is intended to be interpreted broadly as including any form of storage device within which foodstuffs or other degradable materials are stored at temperatures below 0° C.

### Background of the Invention

The use of refrigerators, including freezer cabinets, for the storage of frozen foods, ice cream or medical supplies is extremely widespread. Few people expect that, when they purchase a refrigerator, any health hazard could be involved. In deed, the main purpose of purchasing a refrigerator is often to avoid health hazards which can arise through storing food at, for example, room temperature.

The storage of food or other products in a refrigerator can, however, result in a health hazard if there is any interruption in the functioning of the refrigerator; the most common cause of which is loss of the electrical power supply. Whatever the reason for the loss of the electrical power supply, if this continues for any length of time, the

foodstuffs or other contents of the refrigerator can thaw and, as a result, there can be a rapid growth of bacteria.

If, of course, the power supply is recommenced before the user of the refrigerator has occasion to open the refrigerator, the refrigerator contents will have refrozen and the user will be unaware that thawing and rapid bacterial growth have taken place.

It is accordingly an object of the present invention to provide a refrigerator indicator device the use of which will enable a clear visual indication to be given that thawing of the refrigerator contents has occurred.

#### Summary of the Invention

According to a first aspect of the present invention there is provided the combination of a refrigerator (as herein defined) and a refrigerator indicator device for placing within the refrigerator, the device comprising a transparent or translucent container containing a liquid which is frozen at the normal operating temperature of the compartment in which the device is placed, the device being capable of being placed within the compartment with the container in one attitude and left therein for a length of time such as to allow the liquid to freeze, the container then being inverted so that the liquid which has frozen within the container then occupies the upper portion of the container.

According to a second aspect of the invention there is provided an indicator device for placing within a freezer compartment of a freezer or refrigerator, said device comprising a transparent or translucent container partially filled with a liquid which is frozen at the normal operating temperature of said compartment, said container also containing a solid body having a density greater than that of the liquid such that, if the container is placed within the compartment for a length of time sufficient for the liquid to freeze and then inverted, the solid body will remain in its embedded position within the frozen liquid for as long as the liquid remains frozen whereas, in the event of a rise in temperature within the compartment such as will result in melting of the frozen liquid, the solid body will move downwardly through the melted liquid.

According to a third aspect of the invention there is provided an indicator device for use in association with an item of frozen food, said indicator device comprising a container within which is disposed a quantity of ice containing a dye or other colouring material, said ice being located adjacent or in contact with a layer or layers of an absorbent material which, in the event of the ice melting, will become coloured by the dye or other colouring material.

The container may be in the form of a transparent or translucent tube within which the ice is located, the ice being sandwiched between two layers of wadding so that, in the event



of melting of the ice, the dye or other colouring material will impregnate at least one of the two layers of wadding to provide a clear visual indication of the melting of the ice.

The container may alternatively be in the form of a sachet which is shaped so that it can readily be placed with a surface thereof in contact with an item of frozen food, the sachet being formed in the opposite surface with one or more apertures to provide communication between the interior of the sachet and a layer of wadding or other absorbent material placed in contact with the sachet such that, in the event of melting of the ice, the coloured water thus formed will pass through the aperture or apertures to effect permanent coloration of the layer of absorbent material and thereby provide a clear visual indication of the melting of the ice.

#### Brief Description of the Drawings

Figure 1 is a perspective view of a first form of indicator device,

Figure 2 shows the device of Figure 1 mounted within a holder, and

Figures 3 to 9 show further forms of indicator device.

Description of the Preferred Embodiments

Figure 1 shows a device in the form of a capsule 10 which is formed as a moulding of a translucent or transparent plastics material such as polyethylene or polyvinylacetate. The capsule 10 is 'torpedo' or 'sausage' shaped in that both ends are rounded and, within the capsule 10, there is a measured quantity of water 11 and a spherical body 12. The measured quantity of water 11 is such that the interior of the container is partially filled and the spherical body 12 is formed of a material which has a density significantly greater than that of water.

Part of the water may be replaced by glycol or some other alcohol depending on the temperature of the compartment within which the device is to be placed; the lower the temperature which should be maintained, the lower the required freezing point of the liquid and consequently the higher the proportion of glycol or other alcohol. The liquid preferably also contains a dye so that the position of the liquid or frozen solid within the capsule 10 can readily be identified.

In use, the capsule 10 is placed as shown in Figure 1 in the freezer compartment to allow the liquid to freeze with the spherical body 12 embedded in the frozen solid at the bottom of the capsule. The capsule 10 is then inverted and replaced in the freezer compartment with the spherical body 12 and the frozen solid uppermost. For as long as the power supply to the

freezer compartment is effective, the liquid will remain frozen and the body 12 will remain at the top of the capsule. If, however, the power supply is interrupted and the temperature within the compartment falls so that the frozen solid softens or starts to melt, the spherical body 12 and the melted liquid will fall to the bottom of the capsule to provide a permanent record of the interruption to the power supply.

Referring next to Figure 2, this shows the capsule 10 mounted within a holder 13. The holder 13 can be rectangular as shown enabling the capsule 10 to be placed on the base of a chest freezer or on a freezer tray. The holder 13 can be mounted in position by means of hooks, or by a magnet or by a nylon cord.

Figure 3 shows the provision of a suction cup 14 for mounting the capsule 10 in position within a refrigerated compartment. The capsule 10 is provided at both ends with graduations or markings and, as will be appreciated, the provision of the suction cup 14 enables the capsule 10 to be placed within the compartment in the orientation shown and then inverted after the liquid partially filling the container has frozen.

Figure 4 shows the use of a capsule 10 the configuration of which corresponds to that of an hour-glass. Figure 5 shows the use of a capsule of hexagonal cross-section and having a hook 15 whereby it can be suspended within a freezer

compartment. Figure 6 shows the use of a spherical capsule 10 partially filled with a liquid 11, the spherical capsule being provided with a suspension hook 15.

Turning next to Figure 7, this shows the use of a rectangular container 10 which is partially filled with a liquid 11. A flat plate 12 is contained within the liquid such that, after the liquid 11 has been frozen and the container then inverted, the plate 12 will tend to remain in the position shown in Figure 7 provided that there is no interruption to the power supply to the freezer.

A somewhat different arrangement is shown in Figure 8. This includes a translucent or transparent tube 20 of, for example, polyethylene, which contains a central disc 21 of ice which is coloured, for example, red by means of a suitable non-toxic dye or other colouring material. The coloured disc 21 is sandwiched between two layers of white padding 22, one fitted into each end of the tube 20. If, therefore, the disc 21 of ice were to melt then, regardless of the disposition of the tube 20, at least one of the layers of padding 22 will be coloured.

The device shown in Figure 8 is intended primarily for use with frozen food, for example, the device may be placed within a packet of frozen vegetables. The tube 20 may also, if required, be attached by means of an adhesive strip to a container within which frozen foodstuffs are contained.

Referring finally to Figure 9, this again shows a device for use with frozen foodstuffs. For example, it may be used in connection with the packaging of frozen chickens. The device of Figure 9 includes a sachet 30 within which is contained a quantity of ice which has, as with the embodiment of Figure 8, been coloured. The sachet 30 is of generally flat form so that it can readily be placed against the side of, for example, a frozen chicken, either within the wrapping for the chicken or attached adhesively or otherwise to the outside of the wrapping.

The sachet 30 is provided with a series of perforations or apertures 31 which are covered during freezing of the coloured ice within the sachet 30 but which are uncovered prior to placing of the sachet 30 in contact with the frozen foodstuff. this covering may be provided by, for example, a plastic strip (not shown) which can be peeled away from the sachet 30 when desired. In use, the perforations or apertures 31 are covered by a layer of padding or wadding 32 which extends over a major part of the area of that side of the sachet 30 remote from the frozen foodstuff.

The layer 32 can be a white material and the colour of the ice within the sachet 30 may be red such that, for as long as the ice remains frozen, a clear visual contrast between the two colours is obtained. In the event, however, of melting of the ice, the layer of padding or wadding 32 will become coloured by the colouring material in the now melted ice. A

clear visual indication will thus be provided indicating that the temperature of the frozen foodstuff has been allowed to reach a temperature at which melting has occurred.

The devices shown in Figures 8 and 9 are of particular application in relation to the packing and distribution of frozen poultry. A clear visual indication is thus provided to a customer as to whether or not an item of poultry to which the device is attached has been maintained at the required temperature.

Claims:-

1. The combination of a refrigerator (as herein defined) and a refrigerator indicator device for placing within the refrigerator, the device comprising a transparent or translucent container partially filled with a liquid which is frozen at the normal operating temperature of the compartment in which the device is placed, the device being capable of being placed within the compartment with the container in one attitude and left therein for a length of time such as to allow the liquid to freeze, the container then being inverted so that the liquid which has frozen within the container then occupies the upper portion of the container.

2. An indicator device for placing within a freezer compartment of a freezer or refrigerator, said device comprising a transparent or translucent container partially filled with a liquid which is frozen at the normal operating temperature of said compartment, said container also containing a solid body having a density greater than that of the liquid such that, if the container is placed within the compartment for a length of time sufficient for the liquid to freeze and the inverted, the solid body will remain in its embedded position within the frozen liquid for as long as the liquid remains frozen whereas, in the event of a rise in temperature within the compartment such as will result in melting of the

frozen liquid, the solid body will move downwardly through the melted liquid.

3. The combination of Claim 1 or a device according to Claim 2, in which the container is of 'hour-glass' configuration.

4. The combination of Claim 1 or a device according to Claim 2, in which the container is provided with a suction cup to enable it to be mounted in position within the compartment.

5. An indicator device for use in association with an item of frozen food, said indicator device comprising a container within which is disposed a quantity of ice containing a dye or other colouring material, said ice being located adjacent or in contact with a layer or layers of an absorbent material which, in the event of the ice melting, will become coloured by the dye or other colouring material.

6. An indicator device according to Claim 5, in which the container is in the form of a transparent or translucent tube within which the ice is located, the ice being sandwiched between two layers of wadding.

7. An indicator device according to Claim 6, in which the container is in the form of a sachet which is so shaped that it can readily be placed with a surface thereof in contact with an



item of frozen food, the sachet being provided in the opposite surface with one or more apertures.

8. A device for mounting within a refrigerator (as herein defined) substantially as hereinbefore described with reference to and as shown in Figures 1 to 7 of the accompanying drawings.

9. The combination of an item of frozen food and an indicator device substantially as hereinbefore described with reference to and as shown in Figures 8 and 9 of the accompanying drawings.